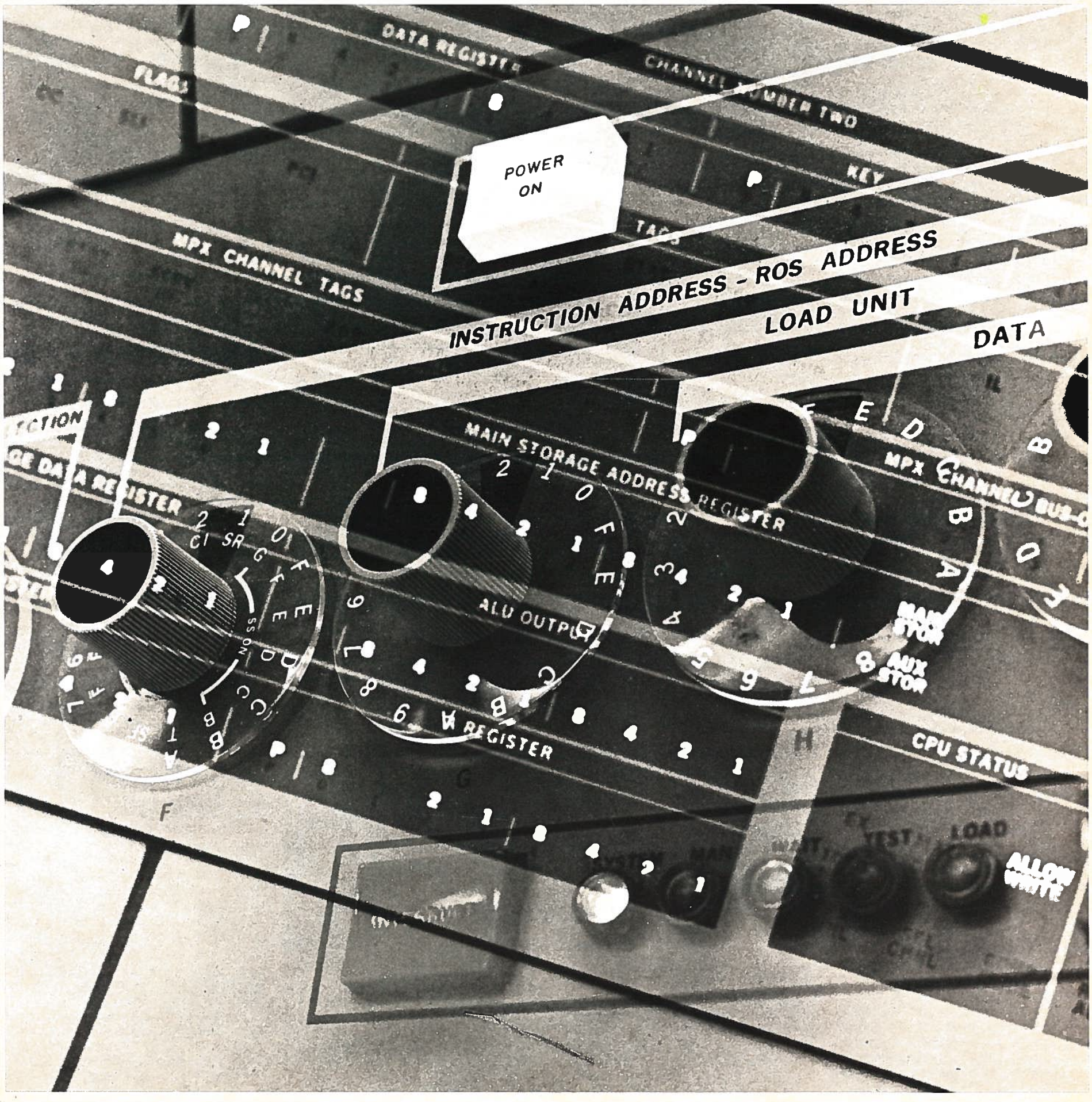
plane
GRUMMAN
news

Vol. 30, No. 8, Bethpage, N. Y., April 23, 1971



Future look—page 2; E-2C on track—page 5; Homecoming—page 12

Look at the future— their todays shape our tomorrows

It's certainly not uncommon to plan . . . it's vital to success and survival. And prophecy is its fickle companion. What is uncommon is the wide-sweeping ability to balance just the right portions of past and present knowledge with a not-yet unfolded future.

There are many men and women pursuing this somewhat treacherous art. And sometimes the stakes are incredibly high—as they are, for example, in national defense.

So corporations such as Grumman keep on board talented and versatile people whose "blue sky" proclivities have deep roots in today's pragmatic reality—people like Bill Tebo, director of Advanced Aircraft Systems, whose work den is in a security area of Plant 5. He and his permanent staff, working in unison with in-house experts in specialized fields as projects demand, form the corps that plans much of the Company's aircraft future. It's an elite (and ever changing) group, though Tebo himself might shy away from the word "elite," for he is not an elitist. He thinks in broader, more encompassing terms. For instance:

"Grumman has talents second to none in the industry. We have the people, and we'll win our share of the business and more."

Tebo leaned back a little in his chair, his eyes mirroring relaxed intensity, and pursued that thought:

"Our aircraft product line is the key. No other Company has one as good as ours. There's F-14 and future versions. The A-6 Intruder line has a long way to go yet. Then there's EA-6B, the E-2, the C-2, and the OV Mohawk—all current aircraft. With the E-2 and C-2, we're looking for fan-jet retrofits, thereby eliminating the prop jobs. And there's the Gulfstream IIs, which will be used for weapons system trainers. Remember the SA-16, the Albatross? We have a bid in to modify the Albatross and use it to 'bomb' fires with water."

Bright scene

He emphasized that in "the tight money market today, we're on the bright scene: We can do more than any other aircraft company. We have the capabilities, the diverse types of airframes, and avionics know-how, here and now, and a lot of modification work." Shell Pinsley, Tebo's deputy, further explained that "Prior to the '60's, we built airplanes; during the '60's, we built integrated weapon systems like the A-6 and E-2; and in the '70's, further integration is required to provide fully integrated tactical aviation warfare. All this is designed to meet any enemy threats."

With the quiet forcefulness of a fast-moving mobile library, Tebo spelled out (insofar as possible with proprietary-based material) the new world on the horizon . . . and a bit beyond. His large, piercing eyes, set in a full and almost cherubic face that somehow suggested both warmth and rock-like firmness, focused on an unknown point in space for no more than a second—he bundles up his thoughts with amazing speed and clarity—and then came the rush of words, succinct and orderly. He started with the VTOL (Vertical Take-Off and Landing) concept, and he said "the Request for Proposal will be seen in about 1973."

One VTOL, called HIPAAS, would be a light (25,000-pound) attack aircraft using much more boron than is the case with the F-14 Tomcat. It is envisaged as a versatile plane that could replace the A-4 and A-7.

Military potential

There is another VTOL program with definite military potential, which has been dubbed the Helicat. "A quarter-scale of the prop rotor-driven aircraft is being tested now in the NASA-Langley wind tunnel, and the tests are much better than we expected. The tests, basically, relate to some novel wing stiffness experiments.

"What we're after with the Helicat is the hover of a helicopter and the speed of a fixed-wing aircraft. We've been studying it for 18 months or more and hope for a couple of contracts this fall for critical component hardware and further studies. We see four main uses for it:

- To employ the Navy's new air-capability philosophy of fitting landing decks on ships not originally meant as aircraft carriers
- To replace Army helicopters in the 1980s
- To effect air-sea rescues for the Air Force
- To fly it as a 10- or 12-passenger 'air taxi' for civil use."

That led into the beginning of the STOL (Short Take-Off and Landing) discussion. Tebo brought in Jim Richter, project engineer, to discuss two in-process STOL programs, one for the Air Force and one for American Airlines (at their request). Both are being supported by a Japanese company, Shin Meiwa, which has a decade of experience in STOL and has flown its PS-1 seaplane for more than two years.

"With their experience and our aircraft knowledge, I think we've got what it takes to satisfy the needs of American," says Richter. "Thirteen separate outfits were in the original studies and now only four are left, and we're one of them.

"STOL capability is achieved," Richter says, "by using the boundary layer control system developed by Shin Meiwa in PS-1. (In the boundary layer system, high-velocity air is blown over the flaps, elevators, and rudders to produce better lift qualities.) The Grumman design uses the basic wings and tail section technology and power plant of PS-1. A versatile fuselage concept is employed. It can accommodate about 90 passengers for airline use, or can be easily modified to meet military requirements."

How it works. **Project Engineer Jim Richter discusses with Bill Tebo and Andy Kaufman (L to R) a proposal for the Helicat, a craft with both hover and high-speed capabilities. It could be used by the Navy, Army, and Air Force as well as civil airlines. (Photo by Nat Scherer)**

Future transport planee

In addition, a jet-powered STOL transport plane is "on the boards" for city-center to city-center use in the future. This is to be a very quiet plane, one quieter than the noise level of a typical city street. It'll have a 500-mile range and "good ride qualities," says Tebo.

There's a significant added plus to this STOL activity, too: Under a teaming arrangement currently being negotiated, either Grumman or Shin Meiwa can be prime or co-contractor depending on whether the business is in the western or the eastern hemisphere.

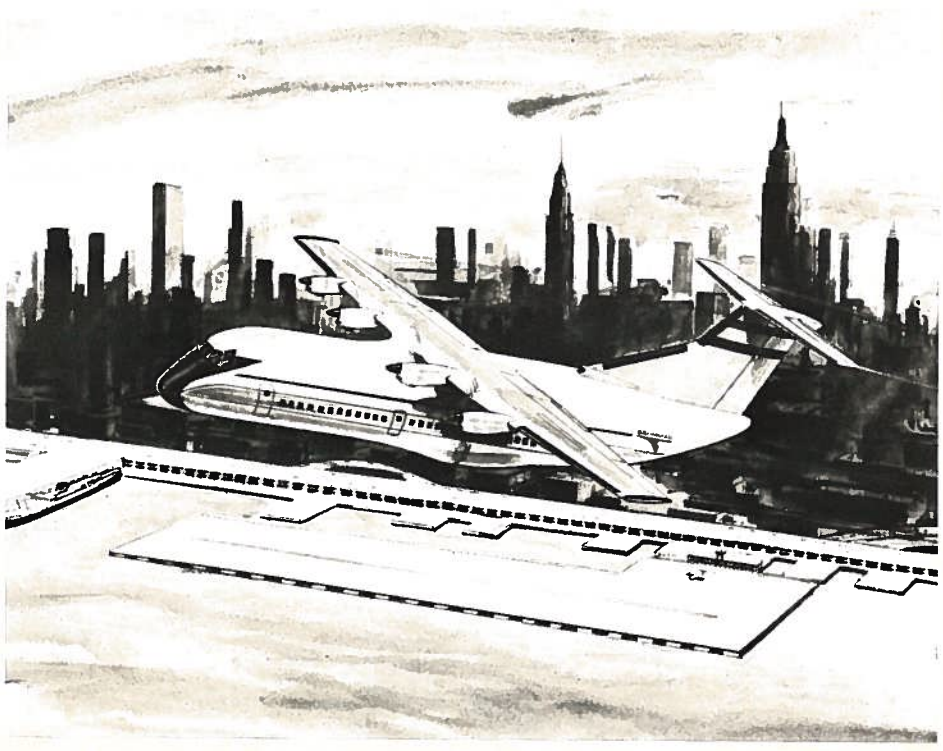
All this business is just a part of what's going on in Tebo's area. As he says, "Much of what we do on new projects is either proprietary or secret."

But the organizational form—which varies a bit from the traditional style—is neither proprietary nor secret, and on the basis of past experience, it works admirably. Roughly one-third of the group is "permanent," the core around which specific "hot" projects revolve. The "two-thirds section" is made up of two types of people, generally: those who have had experience on one or more in-house projects, and those who are new to the operation. These groups "cycle," as it were, so that there's always a mix of evolving expertise and the people grow more expert on other projects; the tie betwen new blood and old is never lost.

In the "mix master," then, are the people who are married to a particular project **and** the specialists on Tebo's staff, which include people from Engineering, Contracts, Product Operations, Flight Acceptance, Product Support, Processes, and Grumman Data Systems. Says Tebo:

"Every skill that is needed is here—or

(Continued on page 7)



Look of future. **In Advanced Systems aircraft thinking is VTOL (Vertical Take-Off and Landing), a plane that would combine hover capability and high speed. It reflects Navy philosophy of having aircraft on decks of ships not originally designed as carriers. (Rendering by Craig Kavafes)**

Space engineers preparing large telescope satellite study

The Orbiting Astronomical Observatory, OAO-2, continues dependably orbiting the earth 485 miles out in space, "doing its thing," while plans go forward on the ground for future developments in celestial exploration. OAO-C, about a year from launch, is now at Goddard Space Flight Center being prepared for systems tests. Thermal vacuum testing will begin in July. It will carry two experiments: an ultraviolet star study for Princeton University and an X-ray experiment for the University College of London.

OAO-B, launched in November 1970, was prevented from orbiting by failure of the shroud to separate.

Farther on down the road, "LST" (for Large Space Telescope) is being actively considered. Chris Witt, formerly OAO Project engineer, and Pete Simmons, assistant to Vice President Ralph Tripp for astronomy, are heading a new Grumman study team for a spacecraft that would carry into orbit a telescope with a three-meter (118-inch) mirror. After the Grumman group devotes about six months to design and analysis, it is anticipated that the National Aeronautics and Space Administration will hold a Phase B design competition for such an observatory—a study comparable to the High Energy Astronomy Observatory Grumman is working on at the present time.

The LST observatory would be two or three times longer and four times heavier than the OAOs.

New generation

Furthermore, LST will belong to the new generation of satellites designed to be compatible with Space Shuttle operation, according to Ted Moorman, OAO Program manager. "The big observatory will be planned so that it can be updated **in orbit** with new experiments or electronic improvements," he said. "Or, conceivably, faulty modules could be replaced during orbit by a team of space experts from the Shuttle orbiter."

OAO-2, since its successful launch on December 7, 1968, has completed more than 12,000 orbits of the earth, and its University of Wisconsin experiment continues to pile up new and surprising data on planets, comets, and stars. Observations by the Wisconsin and Smithsonian instruments have discovered for example, that the comet Tago-Sato-Kosaka is surrounded by a massive cloud of hydrogen; have found that young, massive stars are hotter than indicated by previous measurements; have found differences in the composition of many stars previously considered similar; discovered that many remote galaxies are even farther away than originally thought. All these are of particular interest to astronomers.

Dr. Al Boggess, GSFC astronomer associated with the OAO that was lost in November 1970, is using 20 percent of the Wisconsin observing time, by agreement, for his own investigations.

OAO-2 has far exceeded its contractual life of 30 days; it is now approaching its 29th month of successful operation.

Significant program

Moorman sees the LST as a significant program that, if it begins next year, could run through the 1980s. It will probably be planned for launch in the late '70s, and, he said, the program is expected to have vehicles in orbit for 15 years "capable of being serviced and updated from the Space Shuttle orbiter."

Wydler cites space benefits

"It is time to stop apologizing for the space program."

Those are the words of Rep. John Wydler of Nassau County, who is firmly convinced that "We need the space program."

As he points out, a lot of people think otherwise. They see our space efforts as "a waste of funds" and urge pouring our wealth into earthbound "present needs." Some, says the Congressman, "would do away with the space program and claim the country would be better off. They are wrong."

For Representative Wydler, "The scientific return to our nation . . . will be new information about our universe of use to generations of Americans yet to come." Further, he reminded readers in a recent issue of the L. I. Commercial Review that "Advances in communication, meteorology, medicine, and other sciences have already been made because of the space program. Real hope to fight pollution and to clean up the environment depend on breakthroughs in science that the space program is exploring."

He cites, too, the increasingly cooperative actions in science and space by the United States and the Soviet Union. "Perhaps," he says, "two nations who cannot agree on matters pertaining to the earth will find space an area on which agreement can be reached, cooperation and trust begun."

Part of the tragic irony of today—a 50 percent cut in the space program and unemployment around the nation—is that neither earthly needs nor supportive space exploration is being fulfilled. "We need the space program. We are giving it a new emphasis of problem solving by stressing applications on earth. It deserves the support of thoughtful Americans."

Clock watcher. **It's that time again. Here's a helpful reminder from Jackie DeSantis of Grumman Data Systems: Turn your clocks ahead one hour this Sunday to get in stride with Daylight Saving Time. (Photo by Fred Annette)**

Two 'program' computer ideas into rich Savings Bond spinoff

Most people look at the German adjective "kaputt" as meaning a "wreck," at the least a machine breakdown. Keith Madden of Propulsion in Plant 15 makes a 180-degree turn on it and comes up with KAPUT—a very positive "anti-wreck" computer program system that is a real time saver, and, incidentally, provides Keith with $575 in bonds as top man in the latest Employee Suggestion competition.

It was a squeaker, though, for breathing down his award-neck was Plant 3's Mike Cherbini of Machine Operations Technical Services. His idea earned him $550 in bonds.

According to Keith, his brainstorm was "simple," the type of thing a lot of people are going to ask, "Now why didn't I think of that?" If it's simple, describing it might not be (except for programmers, of course). As Keith puts it:

"We had two subroutines, TABIN and STINT, which are part of a larger computer system. TABIN has the capability to read in tables from punch cards, stored, like STINT, in a tape library. What STINT does is to 'tell' the main program when an error (lack of data) occurs. **And that's all!** So if a programmer wanted data beyond the library of tables, he was forced back to the time-consuming task of writing his own error analysis procedure, have it keypunched, marry it to the program, and de-bug it.

"My idea was to include a third routine in the library, KAPUT, that would automatically analyze a 'table look-up error.' Now the three routines are in the library for use by any programmer."

Programming was the key to Cherbini's winning suggestion, too. He modified the traditional way of performing five-axis numerical control programming in the Automatically Programmed Tools (APT) program. "I came up with

(Continued on page 7)

Pacific facility plans cancelled

Lew Evans announced on April 12 that Grumman International was cancelling its plans to activate the Grumman Pacific Facility in Singapore. Grumman Pacific (Pte.) Ltd., a subsidiary of Grumman International, was to have operated an aircraft overhaul repair and aerospace complex at a former British air base in the Republic of Singapore.

Evans said: "Extensive evaluation of the potential has led to the conclusion that there is not a large enough business base to proceed at this time."

Stressing the excellent cooperation of both the Singapore Government and the U.S. Government in assisting Grumman's initial efforts, Evans also voiced his personal admiration for the understanding and business attitude of the Government of Singapore throughout the negotiations and deliberations.

In explaining the decision to cancel, Bob Somerville, President of Grumman Pacific, stated, "Intensive studies conducted on potential business for aircraft repair and overhaul in Singapore indicated too small a volume to provide the business baseline required to offset the initial start-up costs." It was intended to use aircraft and equipment overhaul as a business base during the initial years while building the required technology for aerospace product manufacture.

Somerville further voiced his strong appreciation to all the people in the many departments of Grumman who have assisted the work and studies conducted during the past 10 months. All Grumman Pacific personnel, he added, have been relocated within the Grumman family.

Grumman International will retain the corporation Grumman Pacific (Pte.) Ltd. in existence, Somerville said, and will continue active sales and marketing programs throughout the Far East.

About the cover . . .

When Fred Annette of Presentations Services photographed elements of the Data Systems Center, he decided a double-exposure photo of computer and operations consoles might best express the mod mood.

Navy looking for bigger punch in Flagstaff gunnery trials

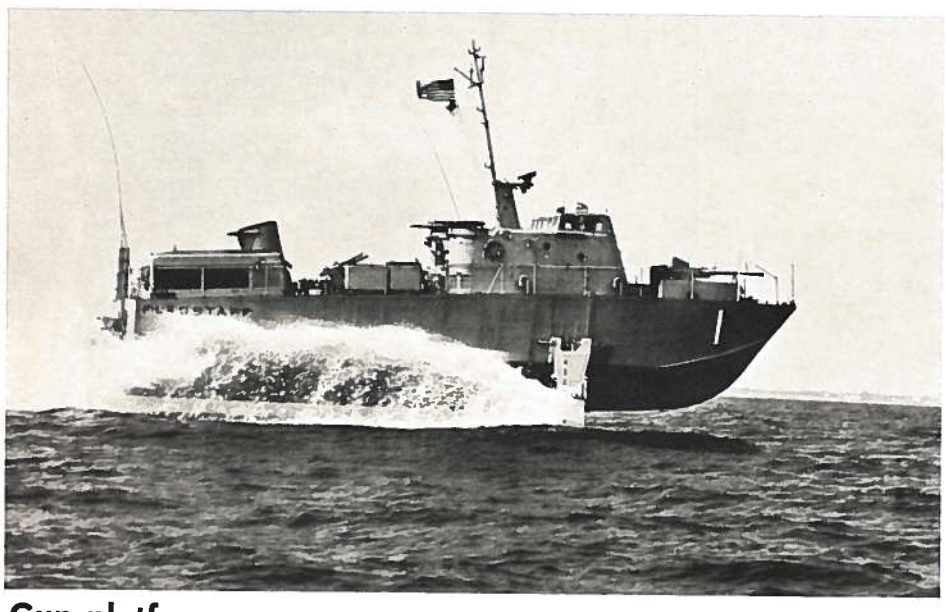
A combat veteran of Vietnam, Grumman's hydrofoil gunboat PGH-1 Flagstaff, is on the West Coast going through extensive gun firing trials. A 152 mm gun from a Sheridan light tank has replaced the much smaller caliber cannon that Flagstaff carried when it was operating out of Da Nang. The trials are being held to demonstrate the feasibility of operating such a large size gun aboard a small coastal patrol craft. The firing tests are expected to last a month.

Grumman has pioneered in hydrofoil craft and is in proces of preparing a proposal for hydrofoil craft logistic support to include manual updating and training on systems peculiar to the hydrofoil gunboat: propulsion systems, foils and struts, and transmission. The Company's past experience with development of hydrofoil craft dovetails with the present interest of high-level Navy officials in hydrofoil gun ships and in patrol hydrofoil guided missile ships (PHM).

The PHMs are planned for use as missile attack ships for high speed operation in heavy seas. They would be about 120 feet in length, with 150-ton displacement—much larger than the 67-ton, 75-foot Flagstaff.

The Navy presently has a 212-foot, 310-ton ocean-going hydrofoil ship, AGEH-1, that was built by Lockheed in Seattle but designed by Grumman at Bethpage in the early 1960s.

Hydrofoils on a gunboat, as on the forthcoming PHM, maintain the hull entirely clear of waves when the craft is operating in rough water, and, by eliminating hull slamming nad pitching, produce a smooth, stable flight for a missile platform. The foils provide lift, which raises the hull clear of the water. In rough seas a hydrofoil-equipped craft can go faster, with the same horsepower, than an identical boat without hydrofoils.



Gun platform. **Grumman hydrofoil ship Flagstaff whizzes along on its foils, providing stable platform for its armament. In West Coast trials this month, a 152 mm gun from a Sheridan light tank replaces the 40 mm cannon seen on the foredeck in this photo.**

CALENDAR of events

Notice of events for period May 14 - 28 should reach Plane News by **Tues., May 4.**

Chess Club: Tues., 5 p.m., Plt. 3 Cafe, tourn., games. Alex Ikonnikow, Ext. 7592.

Coin Club: Wed., 12:05-12:50, Plt. 25 Vendor Conf. Rms. Ken Hale, Ext. 1936.

Dance Club: Every Tues., 8:30-10 p.m., St. Francis of Assisi, Northgate & Clay Pitts, Greenlawn, ballroom dance classes, $2/session. Len Luke, Ext. 9682.

Duplicate Bridge Club: Thurs., 5:45 p.m., Plt. 3 Pete Harrington, Ext. 1812.

Ex-Servicemen's Club: First Mon. of month, 7:30 p.m., Plt. 28 Audit., exec. & gen. mtg. Al Kordula, Ext. 87259.

Family Campers: Fri., Sat., & Sun., Apr. 23-25, Wildwood State Park, first campout of season. Bill Lord, Ext. 2914.

Fencing Club: Fri., 5 p.m., Plt. 30 Cafe, competitive fenc. & instr. Joe Campisi, Ext. 1134.

Flying Club: Fri., May 7, 5 p.m., Plt. 28 Audit., FAA film. For info. on flt. & ground schl., Mal Gerry, Ext. 1396.

Horseback Rid. Club: Every Sun. Caren Carlson, Ext. 2725.

Retiree Club: Wed., Apr. 28, 1:30 p.m., Holiday Manor, reg. month. meet. GAA, Ext. 2133.

Rod & Gun Club: Wed., Apr. 28, 5:30 p.m., John's Oasis, Hazel St., Hicksville, gen. membership. W. Schillinger, Ext. 57-617.

Ski Club: Wed., Apr. 28 & May 12, 8:30 p.m., Holiday Manor, Hicksville Rd., Bethpage. Lee Badalamenti, Ext. 2171.

Soccer Club: Sun. Apr. 25, 12:30 p.m., Reserve Team in State Reserve Cup vs Hota B of German Amer. League, Grumman, Plt. 3 field; Sun., May 2, 2:30 p.m. Premier team vs Amityville, Plt. 3.

Stamp Club (Bethpage): First 3 Wed. of month, 5 p.m., Plt. 30 Cafe, swapping, circuit bk. sales, auctions. Marty Harow, Ext. 9172.

Wgt. Watchers: Every Tues., 4:45-6:45 p.m., Plt. 28 Audit., Spkr. Mimi Ackerman, WW lecturer. Lee Badalamenti, Ext. 2171.

Walkers take note . . .

Pedestrians, take note. Beginning Saturday, May 1, and until further notice, the pedestrian gate at the west end of Plant 5, off South Oyster Bay Road and east of Plant 39, will be closed and locked. The announcement comes from Captain Bernie Hill of Plant Protection.

Annual Meeting

On Thursday, May 20, the annual Grumman Shareholders Meeting will take place in Hangar 3, Plant 4, Bethpage, beginning at 2 p.m. Grumman Corporate Secretary Larry Rockwell asks the cooperation of those Grumman employees who own Company stock and who plan to attend the meeting.

To expedite the orderly and prompt seating of visiting shareholders, it will be necessary to register in advance. The annual meeting is often the only opportunity that visiting shareholders have of seeing the Company products, and to provide sufficient seating for these, advance registration of employee shareholders is required. Only those persons owning stock as of the record date, April 1, 1971, are eligible to attend.

Grumman personnel who own Company stock and have received a proxy in the mail may pre-register at any Employee Services Office on any working day before May 20. If you have mailed in your proxy and intend to be present at the meeting, check in with your nearest ESO to confirm your intention. A badge sticker will be issued to permit your entrance to the meeting.

Because of the limited space available, shareholders are requested to refrain from inviting their wives, children or friends to the meeting.

Grumman stock obtained through the Company's Employee Investment Plan is held in trust for each individual member by the Plan's Trustee; therefore membership in the Plan does not automatically entitle participants to attend the annual meeting.

Ecosystems has 'Earth' display

If you feel like celebrating Earth Week, you might want to take the children and visit the Hayden Planetarium of the Museum of Natural History in Manhattan this weekend. Grumman Ecosystems Corporation, Inc., was invited by Dr. Ken Franklin of Hayden to stage a display that would explain some of the ecological problems that increasingly clutter the earth. "Learning More About the Planet Earth" is its title.

The mural, 20 x 12 feet, has been on display all week and will continue at least for a few days longer in the first floor lobby opposite the ticket office. It consists of five photographic panels prepared with the assistance of the Grumman Repro Lab in Plant 2:

- Pennsylvania geological features that show up with side-looking radar imagery
- Wetlands studies of the Patuxent River area
- Prince William Sound, Alaska, photos giving basis for environmental management studies
- Photos of specialized equipment the Ecosystems' Gulfstream I aircraft carries for remote sensing and other special investigations
- Photos of a power plant location in Canada in terms of black & white, color, color infrared, and thermal infrared.

"When you get to thermal infrared, you discover things that you weren't aware of before," says Dave Komives of Ecosystems, who had charge of the Hayden display.

Get new posts

John O'Brien, Administrative Vice President, announced two appointments last week: Al Mead to the Resources Management staff; Art Frank as director of the Property Management Department.

Mead will continue as chairman of the Fixed Assets Committee and as a member of the Corporate Proposal Committee, Corporate Facilities Committee, and Facilities Operations Review Board. In addition, he will coordinate the ongoing consolidation of all test labs. He is in Plant 12, Ext. 3508.

Frank will direct the Property Management activities and functions established in January 1970. His office is in Plant 30, Ext. 3616.

Mead and Frank report to O'Brien.

Cut back F-111

The Air Force announced recently that it had cut its planned buy of the General Dynamics F-111 by dropping the last 12 aircraft from the Fiscal 1971 budget. The reduction was made, the Defense Department reported, because of general inflation of the economy coupled with some technical difficulties experienced in the development of the F-111's Mk. 2 avionics system.

Grumman manufactures the aft section for the F-111.

Honor Markow

In the Grand Ballroom of The Plaza last month, the American Iron and Steel Institute presented a Citation for Excellence in Engineering Transportation Equipment to Ed Markow, wheels designer of Special Projects, in its biennial program to recognize the outstanding contemporary work "of architects, engineers, designers, and artists in the Americas." . . . Next month, in Tokyo, Japan, Dr. Peter Simmons of OAO and LST will give a paper before the Ninth International Symposium on Space Technology and Science. The title: "Space Astronomy—the Development of the Sixties to the Scientific Achievement of the Seventies."

Poppy Drive

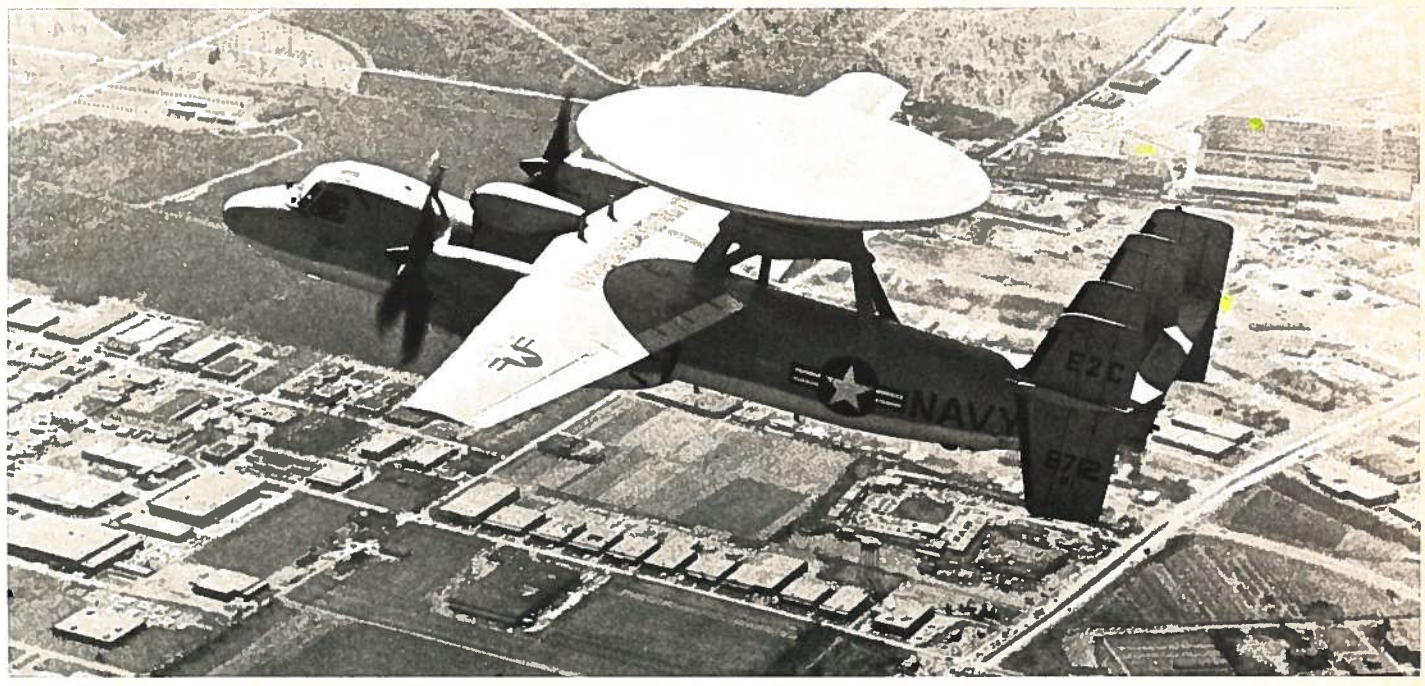
Hospitalized vets of Vietnam, Korea, and other wars are the concern of the Grumman Ex-Service Men's Club. Al Kordula, acting commander of the Club, promises a Club-sponsored poppy drive during May. Wear yours with a smile, knowing that it's for a good cause.

Hawkeye team enthusiastic as E-2C heads for showdown date

Two Gruman Intruders have been playing electronic "hide-and-seek" with a new E-2C Hawkeye for the past couple of weeks, and though it's only a tactical game right now, the future stakes—a much improved airborne early warning system for the Navy and a healthy production contract for Grumman—make it much more than just an interesting exercise.

There are a number of things "new" about the new Hawkeye, but the most important is the E-2C's ability to detect, identify, and track aircraft over land (as well as over water)—an important consideration in Fleet defense when U.S. task forces operate near large land masses such as Southeast Asia.

That far-reaching capability wouldn't be possible, however, without the E-2C's other improvements: a new overland radar, updated computer, new radar displays, and a new inertial guidance system. They all add up to a very new and imposing avionics "suit" for the Hawkeye, one that is expected to increase reliability of the plane many fold by reducing turnaround time between flights, providing automatic problem-isolation in "black boxes," and making these systems easier to maintain, too.



New bird. **Grumman E-2C Hawkeye, next generation carrier airborne early warning defense system for the Navy, is shown during recent test flight over Long Island. (Photo by Dick Sander)**

Some structural changes

But there are few outward changes on the big, twin turboprop. Although the E-2C and the older A and B versions of the Hawkeye couldn't be called identical, there is a striking family resemblance.

If you look closely you'll see these changes:

- A slightly longer nose accommodates passive detection gear
- Enlarged air scoops atop and aside the fuselage provide for improved equipment cooling and cabin air conditioning
- A section of the tail is now imbedded with a new antenna for detection gear

The most significant physical feature of the Hawkeye is a large, rotating saucer-shaped radar antenna; it allows the Hawkeye air crew to see hundreds of miles out where they can pinpoint cruise missiles, surface vessels, and high- or low-flying aircraft . . . and practically anything else that might endanger the Fleet.

"We've had very good overland detection against the two A-6 targets," says Dean Cassell, E-2 Program Operations manager. "We've had the usual problems you can expect with new radar," he says, "but we're coming up with the necessary solutions, too." Cassell points out that M-2 (the first modified E-2C) is now approaching its 50th flight, with well over 100 hours logged since its initial hop on January 20.

The second E-2C (designated M-1 only because it is the older of the two modified aircraft) has been flying over a month and doing "very, very well" while checking out the Hawkeye's new inertial navigation system.

Looming large in the future for E-2C Program Director Tom Guarino and his entire Hawkeye team is the Defense Systems Acquisition Review Council meeting scheduled for the latter part of June. DSARC will meet to evaluate the development of the E-2C and to determine whether the systems hardware—radar, displays, etc.—is ready to commit to production. DSARC, in other words, must evaluate laboratory tests and flight data to determine the health of the program before committing the Government to the next development phase: full production start-up. These frequent reviews reflect the "fly before buy" philosophy of Defense Secretary Laird.

Hawkeye screening. **Many 'software' computer tests on new E-2C are proved out in Plant 14 laboratory. Here, members of Hawkeye flight test team, Ken Gustafson, Jim Woodford, and Jim Madigan (L to R), operate radar display consoles. (Photo by Larry Van Wallendael)**

Meeting challenges

About four months ago when Guarino was named E-2C director he saw three main challenges for himself and his Hawkeye team: maintaining a very tight milestone schedule leading to the DSARC; making a good overall profit on the aircraft for the Company; and providing the Navy with a high-quality weapons system.

Although there are still a few tough development milestones ahead (there were 13 in all), the mood is enthusiastic. Here's how Ken Koehler, E-2C Program technical manager, looks at it: "Generally speaking, when compared to the E-2A, we feel we're meeting with more success. Of course, the E-2A taught us a lot—but even so, as far as calendar time is concerned, we're doing better with the C."

Part of that success, he feels, can be attributed to the video tape recorder aboard the Hawkeye that brings the "real-world" environment into the laboratory. By studying raw radar data (recorded on video tape before it is processed and displayed on scopes), systems engineers can set up a combat environment in the Plant 14 lab, make quick changes in processing or symbology where necessary, and test the effectiveness of those changes in the lab before committing the E-2C to further test flights.

Improving 'software'

These lab tests, Ken points out, are mainly to prove out systems "software"—computer programs that are concerned with display symbology, weaponry, data links, intercept tactics, etc.—all vital to the airborne early warning and intercept control missions of the Hawkeye.

And to assure that there is objectivity, Dean Cassell notes, two representatives from the Navy office at Bethpage—Lt. Cdr. Jim Connerton and Lt. Cdr. Bill Hennessy—fly as part of the E-2C crew to verify data acquired on these flights. Jim Philbin is E-2C project pilot and Dick Van Allen, assistant project pilot.

Although much of the interest naturally is centered on the test flights and associated activity at Plant 14, there are many other groups working hard to prepare the E-2C for a successful review in June, while also looking into possible future uses of the aircraft.

Key members of Guarino's flight test Hawkeye team are: Don Fish of Flight Acceptance, Tom Carasite and Bob Menrisky of Manufacturing, and Dick Anderson, Gerry Norton, and Bob Papaleo of Engineering.

Look for go-ahead

The Navy has shown confidence in progress so far on the Hawkeye by providing Grumman with about $43 million in long-lead time funding for systems hardware. But right now, the heat is on as the entire program team focuses on that critical date with the Defense Systems Acquisition Review Council. Spirits are high: the program is on track, on cost schedule, and all systems are go.

Guarino and his team are looking for DSARC to make the big decsion: a full production turn-on.

H. T. Yanek
Pre-Flight

J. L. Pollak
Elec. Fab.

K. J. Morrison
Router & Shear

W. E. Tuthill
Alodine

E. Szemplenski
Parts Paint

C. Russek
Prototype

F. R. Salerno
Controls

E. J. Blumberg
St. Pts. Assem.

J. J. Menell
St. Pts. Assem.

Service list grows and grows as many Company veterans mark anniversaries

April is a good anniversary month, with Marita Looney and 15 men celebrating 30 years with Grummen; Lois Starrett and 29 men rounding out a quarter-century; a whopping 79 completing two decades; and 32 marking 15 years.

The 30-year roster is comprised of:

PLANT 1: Henry J. Sieck, Producibility.

PLANT 2: Osmo J. Hill, Production Control/Parts Control; William M. Day, Production Manufacturing - Budget; Fred A. Elsner, Production Manufacturing Administration; Harry Kraft, Tool Fabrication Sub-Assembly; Joseph J. Keegan, T/M Engineering Tool Design; Edward Kern, Safety.

PLANT 4: Theodore C. Wendland, Facilities Maintenance.

PLANT 5: Robert W. Cheshire, Surfaces & Assembly.

PLANT 6: Richard N. Swanson, Instrument System Design.

PLANT 10: Morton H. Weinberg, Quality Control Laboratory.

PLANT 11: John J. Schinn, T/M Engineering Tool Design.

PLANT 18: Bernard A. Hill, captain, Plant Protection.

PLANT 25: William Pfeiffer, Reliability/Maintainability Data Systems.

PLANT 27: Churchill O. Phipard, Fuselage Joining; Clinton E. Ketcham, Sub-Assembly.

PLANT 28B: Marita P. Looney, Grumman Athletic Assn.

PLANT 30: Walter F. Gibb, Product Support Customer Orders & Rec.

PLANT 33: George Quick, GSE Mechanical; James C. Mac Kenzie, T/M Engineering Methods Elec. Tech.

PLANT 34: Carmine C. Vitale, Product Support Aircraft Systems Service.

PLANT 36: Harry Cohn, Sub-Assembly; Matthew J. McLaughlin, Facilities Maintenance.

The next group may well have forgotten about 1946 income taxes (and governors) after a quarter of a busy century, but this is what this month's 25-year people found in their Plane News for April 10, 1946:

"Grummanites are reminded today that the New York State Income Tax is due and payable on Monday, April 15.

"If you haven't started to figure your tax out yet, you'd better get busy. However, there's one solace. When you have the form all filled out, divide the tax due. Governor Dewey has signed a bill allowing a 50% reduction in the tax this year."

These are the 30 who sliced their state tax in half in 1946 and who achieve Silver Anniversary status in April 1971:

PLANT 1: Herbert T. Yanek, Pre-Flight Finals/Systems Installation; John L. Pollak, Electronic Fabrication.

PLANT 2: Kenneth J. Morrison, Router & Shear; Willard E. Tuthill, Alodine; Edward Szemplenski, Parts Paint; Charles Russek, Prototype; Frank R. Salerno, Controls; Edward J. Blumberg and John J. Meneli Jr., Steel Parts Assembly; Frank A. Bruscino, T/M Methods Engineering - Aircraft Prod.

PLANT 3: John E. Jacobsen, Small Parts Fabrication; Frank C. Campagne Jr., Wing Final Assembly; Malachi F. Gannon, Facilities Maintenance.

PLANT 4: John R. Knapp, Production Control Records & Release.

PLANT 5: William J. Gawlik, Static Test; Kenneth H. Worden, Surfaces & Assembly.

PLANT 10: Lewis Golden, Quality Control Lab Administration.

PLANT 16: Edward G. Morgenegg, Tool Fabrication - Templates.

PLANT 18: Joseph German, Plant Protection.

PLANT 25: Paul W. Tracy, Structural Designers.

PLANT 27: Albert J. Nickel, Sub-Assembly Major.

PLANT 30: Charles W. Oliver, Requirements Planning; James M. Pinter Jr., General Purchasing; Lois H. Starrett, P/S Supply Operations Management.

PLANT 34: Alexander J. McRae, Structural Analysts.

PLANT 36: Edward J. Lomot, Sub-Assembly; John H. Tiedemann, Fuselage Minor Assembly; Louis W. Buckley, Inspection - Mechanical.

PLANT 86: Louis Raganella, P/S Aircraft Site Management.

•

Three women and 76 men are completing 20 years with Grumman this month:

PLANT 1: Kenneth Schulz, Inst. Aircraft Test; James K. Regan, Fuselage Forward Sub & Majors; Walter E. Becher Jr., Avionics Inst.; John A. Eifler, Pre Flight Finals/System Installation; William T. Merrell, Elect. Fabrication; Philip Fey, Facilities Maintenance; Egidio R. Perugi, Flight Controls; Richard E. Addiss, Program Management - F-14A.

PLANT 2: Andrew Taylor, GSE Mechanical; Leon A. Parker, Hydraulics; Charles Le Conte, Support Equipment Production; Saverio Donato, Production Control - Parts Control; Louis J. Merz, Tool Fabrication - Die Shop; Oswald Porpora, Tool Fabrication Sub-Assembly - Tools; John Cusanelli Jr., Tool Fabrication Lathes; Lawrence D. Platania, T/M Engineering Methods; Burton J. Wilke Jr., Safety; Vito Palazzolo, Inspection - Elecronics.

PLANT 3: Matthew D. Taibi, Fuselage Assembly; Robert Lomot, Honeycomb Pre-Fit; John J. Carriere, Honeycomb Bonding; Henry L. Sandbothe, Facilities Maintenance; Daniel Coffey, Richard A. Duester, and Thomas F. Melia, Inspection - Mechanical.

PLANT 4: Joseph Troccoli and James S. Day, Flight Operation/Gulfstream O & R.

PLANT 5: Walter A. Wandzy, Final Assembly; Joseph R. Julian and Philip A. Pascucci, Static Test; Michael P. Casali, Instrument Aircraft Test; Ernest A. Dawson, Facilities Maintenance; Edward L. North, Presentation Services; Reginald Danielson, Food Service; John E. Weidmann, Electromechanical Design; Michael Guy, Operations Analysis & Planning Research; John S. Meagher, Contracts Aircraft; Harry Horyczun, QC Quality Engineering; Catherine F. Herring, Business Development.

PLANT 6: Harry W. Beecher, Production Control - Parts Control; Robert E. Rau, Production Control Intra-Plant Transportation.

PLANT 7: Armand F. Perry, Inspection - Mechanical.

PLANT 11: James Foisset, Production Control Intra-Plant Transportation; Paul D. Burke, Inspection - Tooling.

PLANT 12: Richard A. Percy, Metallurgy & Welding Engineering; Charles Burke, Chemical Engineering.

PLANT 15: Donald J. Vazquez, Operation Planning & Budget.

PLANT 17: Paul Baruccheri, Shipping Inspection.

PLANT 25: Frank J. Havlicek, Engineering Administration; Theodore Schwartz, Vehicle Drafting.

PLANT 27: Robert Skolnick, Sub-Assembly - Major; John Burkholder and Samuel Sadowsky, Sub-Assembly.

PLANT 30: John W. Abrams, Inventory Control; Herbert S. Phillips and Madelyn Condon, Material Subcontract Management & Staff; Richard G. Erdody, Product Support Comm./Exp. Center; Harold T. Lowe,

(Continued on page 8)

F. A. Bruscino
T M Meths. Engg.

J. E. Jacobsen
Sm. Pts. Fab.

F. C. Campagne
Wing Final

M. F. Gannon
Facils. Mtce.

J. R. Knapp
Prod. Control

W. J. Gawlik
Static Test

K. H. Worden
Surfs. & Assem.

L. Golden
QC Lab

E. Morgenegg
Tool Fab.

Madden, Cherbini top roster of suggestion bond winners

(Continued from page 3)

a new routine for punch cutter locations, PUNCL-8," Cherbini says. "Using engineering information, the programmer defines the contour, writes tool-motion instructions, and PUNCL-8 computes the series of compound planes that bound the swarfed (variously angled) surface. That way I have full control of the tool position."

Says Section Chief Ed Donahue, "The routine gets the job done easier and faster, and more efficiently. The method paid for its implementation on the first job it was used. There aren't additional implementation costs, so after the first run you're saving costs each time PUNCL-8 is used."

In addition to the top single awards, the tidiest sum was chalked up by three men in General Accounting who teamed up to haul down $975. Each of the Plant 30 men got $325, and none of them—Siegbert Brochman, John Cooney, Albert Schneider—was heard bemoaning his largess.

Others on the time-and-money saving list of awards were:

$350: Joe Rizzacasa, Tool Fab-Status & Jig Bore, Plant 2.

$300: Dennis Jones, Inspection-Mechanical, Plant 3; William Smith, Sub-Assembly, Plant 36.

$275: John Bernhardt, Measurement Standard, Lab, Plant 12.

$250: Frank Trimble, Configuration Data Management, Plant 15; Karl Bender, Wing & Combo, Plant 2; Hariot Hopping, Steel Parts Assembly, Plant 2; Paul Lieb, Tool Fab, Plant 2; George Zeman, Electrical Engineering Labs, Plant 14; Walter Grote, Electrical Engineering Labs, Plant 14.

$225: Sidney Strausberg, Final Assembly-Structure, Plant 36.

$200: Luis Machuca, Instrument Fab Repair, Plant 5; Ronald Carter, Machine Shop, Plant 56; Walter Smith, Environmental Control, Plant 5; John Cataldo, Maintenance & Industrial Control, Plant 30; Robert Sutherland, Hydraulics, Plant 55.

$175: Robert Ketcham, Critical Material Control, Plant 17; Norman Saunders, Quality Control Mechanical, Plant 2.

$150: Floyd Young and Richie Canant, both Facilities, Plant 77; James Getty, Tool Fab-Jigs & Fixtures, Plant 1; Mack Vewles, Machine Shop, Plant 56; Stephen O'Brien, Instrument A/C Test, Plant 6.

$125: Timothy Casey, Systems Design & Analysis, Plant 15; John Scarpinato, John Berruti, and Frank Rogienski, all Steel Parts, Plant 2; Pat Savarese, Sue Lewis, Test Support, KSC, Plant 83; Myrtice Holland, Electrical Assembler, Plant 5; David Jahosky, QC Labs, Plant 10; Bernard Natale, Alodine, Plant 3.

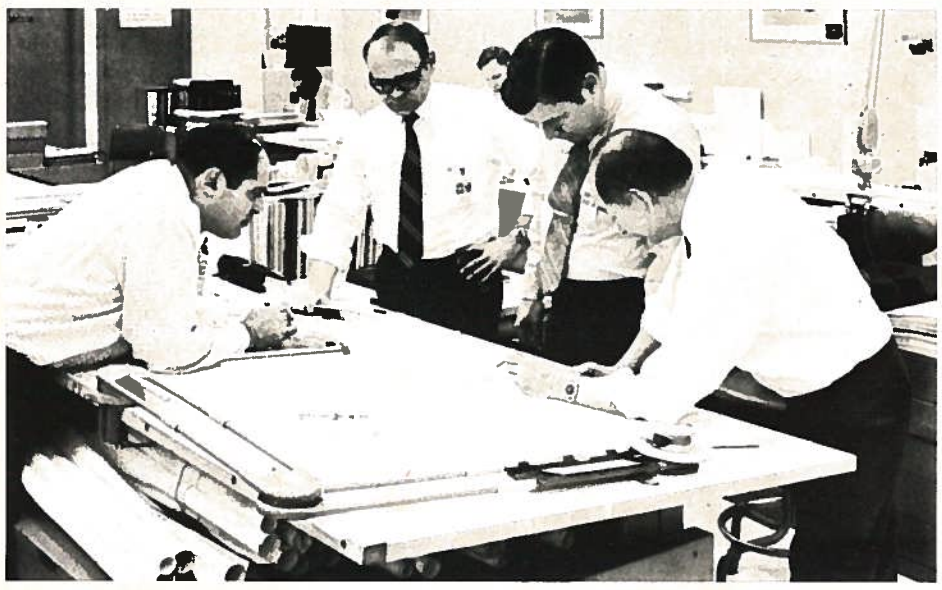
$100: John Beekman, Space Management & Staff, Plant 5; Frank Loguidice, Tool Fab-Jigs & Fixtures, Plant 2; Joseph V. Parisi, Engineering Planning Implementation & Control, Plant 25; Gilbert Raynor, Structural Analysis, Plant 36; Robert H. Sines, Machine Shop, Plant 58; Vincent Caputo, Tool Fab, Plant 16; Albert Stein, Surfaces & Assembly, Plant 5; Hugh Devlin, KSC Manufacturing Shops, Plant 83; Walter Haacke, Tool Fab Loading, Plant 2; Louis Tropia, Chemical Engineer, Plant 12; Frank Rath, Tool Fab, Plant 6; August Nigl, Prop & Clean Room, Plant 2; Albert Kaste, William Reisert, Product Control-Plant Stores, Plant 5.

$75: Mark Sheppard, Configuration Data Management, Plant 15; Patrick Regan, Crash Crews, Plant 4; Rocco Cessario, Anthony Ruffini, Flight Avionics, Plant 8; Floyd Young, Facilities, Plant 77; Lorraine Daly, Gloria Moore, Veronica Clark, all Critical Material Control, Plant 17; Louis Corneau, Isador Fried, Tool Fab Plastics, Plant 11; Helen Kirkland, P/S Secretarial Service, Plant 30.

$50: Pino Guarino, Router & Shear, Plant 2; Charles Kipp, Millwright, Plant 2; Sam Sadowsky, Sub-Assembly, Plant 27; William Kelly, Assembler, Plant 27; Russell Chiarelli, Vito Donofrio, Tool Design Electrical Technician, Plant 33; Frank Weiss, Charles Saurman, Ordnance, Plant 2; Joseph Stamecki, Management & Control, Plant 56; John Bazazian, Facilities Maintenance, Plant 12; Daniel Gorman, Instr. Fab Repair, Plant 5; Richard Riemenschneider and Salvatore Cappiello, Configuration Data Management, Plant 34C; Christopher Rizzuto, Machine Shop, Plant 3; William Feeney, Materials & Process, Plant 12; John Janis, Flt. Development Elect., Plant 7; Joseph Lo Presti and Angelo Pomponio, Final Assembly, Plant 36; John Winn, Metal & Chem. Lab, Plant 12; George Barhold, Instrument Test, Plant 33; Nicholas Garone, Final Assembly, Plant 36; John Aris, Navigation Control, Plant 15; Frank Pacelli, Stress Relief & Hot Form, Plant 2.

$25: Joseph Lo Presti, Final Assembly, Plant 36; Angelo Pomponio, Final Assembly, Plant 36; William Kantler, Inspection, Plant 56; John Black, Machine Shop, Plant 56; Richard Riemenschneider, Configuration Engineer, Plant 34C.

Idea men. **Keith Madden (L) and Mike Cherbini earned a healthy U.S. Savings Bonds jackpot for turning in some improvements in setting up computer programs. (Photos by Bob Settles)**



Board meeting. **Bill Tebo, director of Advanced Aircraft Systems (third from left), gets into huddle with (L to R) Nathan Kirschbaum, Ron Cerank, and Bob Yee, on the design modification of an aircraft now in our product line. (Photo by Nat Scherer)**

Look at the future —

(Continued from page 2)

can be brought in, fast."

Something else is needed, something more than sheer expertise: **cost control.** "One of our main objectives is to force prices down, to give the Department of Defense more quality for less money. It's true that almost everyone's thinking that way, but that doesn't lessen the commitment. As far as I'm concerned, it magnifies it. That's the route to getting new programs.

"Right now, as I mentioned before, we have the best aircraft product line in the country—and product improvement is about one half of our current activity. About 40 percent of our effort goes into new designs. About five percent is specifically directed toward adapting Grumman products for foreign markets in support of Grumman International. In line with the Nixon Doctrine, we expect this to develop into a good business opportunity and a way to preserve the balance of power in the free world."

The challenge, then, is literally worldwide, and time is an inexorable pursuer. Tebo is always aware of that. As he points out, "All the aircraft we see in service today will be replaced early in the '80s. Knowing that, Research and Advanced Development activities must —and will—provide the technology to Advanced Systems to give us the competitive edge we need to win new contracts."

New bus schedule

As of the first of May, inter-plant travel in the Bethpage area will be more convenient and more economical.

Five new radio-equipped Grumman Allied buses will be in service. Three of the buses will be on regularly **scheduled** runs so you'll know when your bus is due. That saves you the frustrations of driving all around the lot trying to find a legal parking spot. And it cuts down on your discomfort during foul weather, when your car and the plant seem miles apart.

The idea and implementation of the schedule come from the fertile gray matter of Tony Quinn and Bernie Shansky of Facilities Engineering, who worked with Plant Protection in providing the new schedule and service. They say that the longest inter-plant trip will be just 35 minutes. As an added convenience, there'll be "flag stops" at Plants 26, 31, 3, and the Credit Union; all you have to do is be outside and wave.

Oh, yes! You may wonder about those other two buses since we started with five but are talking about three. Well, the fourth will be assigned to a dispatcher, and the fifth will be on stand-by and special service.

Schedules will be posted in all plant lobbies and Employees Service offices, and in the ad supplement of Plane News.

Why not clip it out and save it? It's a good planning aid.

J. German
Plant Protec.

P. W. Tracy
Struct. Des.

A. J. Nickel
Sub-Assem.

C. W. Oliver
Require. Plan.

J. M. Pinter
Gen. Purch.

L. H. Starrett
P S Supply Ops.

A. J. McRae
Struct. Anal.

J. H. Culleton
Prod. Engg.

E. J. Lomot
Sub-Assem.

Anniversary roster grows and grows...

(Continued from page 6)

General Accounting; Marion Kmetz, Cafeteria Accounting.

PLANT 34: John R. Holub, M P & P Support Plans & Prop.; Clarence T. Lohse, Product Support Personnel; Henry G. Locke Jr., Product Support Administration; John J. Yuncker, Product Support Field Service Management.

PLANT 35: Fioravante Visconti, Aerodynamics; Jack C. Combs, Vehicle Drafting.

PLANT 36: Charles Logalbo and Bernard Molesky, Upholstery; Helmut F. Weber and Wilbur L. Roe, Sub-Assembly; Joseph A. DiGangi, Surfaces & Assembly; Frank C. Savage, Final Assembly - Structure; Herbert J. Bradle, Structural Analysts; Ralph A. Johnsen, Inspection - Mechanical.

PLANT 37: Thomas G. Murphy, B/P & Off-Site Warehouses; Irving Olsen, Maintenance/Repair/Operation Supply.

PLANT 39: George Martyniw, Industrial Engineering - Space.

PLANT 56: William Wiederkehr, Maintenance Administration.

PLANT 77: Edgar S. Tubbs, Inspection/Quality Control.

PLANT 88: Joseph Dragotta, Requirements Planning.

J. H. Tiedemann
Fuse. Minor

L. W. Buckley
Inspection

L. Raganella
Site Mgt.

Thirty men and two women celebrate 15 years with Grumman:

PLANT 1: Efrain Jimenez, Flight Controls; Donald K. Getrost, Inspection - Mechanical; Stephen J. Baylis, Quality Control Technical Services.

PLANT 2: Nicholas F. Barbetta, Router & Shear; Andrew De Feo, Center Section Final; William E. Stanton III, Manufacturing Schedules & Status; Richard L. Podlaski, Tool Rabrication - Metal Form Tool; Andrew Bokrosh Jr., Facilities Maintenance; Merrill Sturman, Inspection - Mechanical.

PLANT 3: Patrick Di Marzo, Honeycomb Pre-Fit; Karl W. Goehler, Machine Operation - Technical Services.

PLANT 4: William F. Walsh, Production Control - Parts Control.

PLANT 5: Howard Anderson, Final Assembly; Robert E. Kiebitz, Operation Planning & Budget.

PLANT 6: Francis Tallman Jr., Support Equipment Production; Gottfried G. Eggart, Tool Fabrication - Machine Shops; Stephen O. Haizlip, Inspection - Mechanical.

PLANT 7: John D. Young, Flight Development/Operations.

PLANT 15: Henry D. Schettini, Product Support Electro Mechanical Design Engineering.

PLANT 21: Edward Brennan, B/P & Off-Site Warehouses.

PLANT 25: Lauretta M. Kinscherf, Distribution Services; James M. Myles, Chemical Engineering.

PLANT 28: Anne McCullen, Insurance & Records & Benefits.

PLANT 30: James P. Boylan, Equipment Engineering - Process Service Engineering; George Gluick, Cafeteria Accounting.

PLANT 33: Earl Baker, Instrument Aircraft Test.

PLANT 35: Walter Alles, Weight Analysis.

PLANT 36: Allan S. Peterson, Crew & Equipment Integration.

PLANT 38: Peter R. Portanova, Professional Development Program.

PLANT 39: Sherman Perry, S/CAT Engineering Service & Administration.

PLANT 85: Terrell P. Kirk, Jr., Business Development.

PLANT 86: Lloyd V. Bankston, Air Traffic & Radio Communication.

Rintoul earning artistic acclaim

Charlie Rintoul is a tall, thin man with a well-trimmed mustache, gray hair—"a mature mod type," as a friend described him. He might have been looked on as just one of the pioneering crew that left Long Island for the warmer climes of Savannah, Georgia, to establish the machine shop in Plant 55's Gulfstream Commercial Center.

But Charlie is not just another guy, as anyone who knows him will attest. He's an uncommonly creative man, possessing acclaimed talents in painting and sculpture. And it's possible that Charlie himself might not have tapped the well of art that lay silent within him had it not been for a physician who suggested that he take up a hobby.

That was in 1963 when he lived in Huntington, New York. Charlie took his doctor's advice, enrolled in an adult education program, and joined the local art league — and his hands tell the story from then. He won prizes in Huntington, at the Long Island Art Exhibition, and in Grumman shows. So he was well on the artistic road when he arrived at Savannah. But it was just the beginning!

He pursued his avocation with flair, in Savannah, in Albany, Georgia, and in other states, especially North Carolina, South Carolina, and Florida. Several of his works hang, for sale, in the Art Association Gallery in Columbia, South Carolina.

In March, Charlie was the only sculptor requested to enter his work in a Religious Art Show sponsored by Christ Episcopal Church. And early this month, during the Savannah Arts Festival, Charles won signal praise: Of the hundreds of entries, only his sculpture was chosen for the Honor Gallery. His entry, Sylph—which he says is "an imaginary, light, and free form"—was carved from Philippine mahogany of several shades.

His most talked-about work at the Festival was The Clown, a plaque formed of pieces of tin and iron.

Next stop is the Albany, Georgia, Art Show. And then, well. . . . just follow the quiet and fast-moving artist.

Artist at large. **Charlie Rintoul of Grumman's Savannah Commercial Center eyes his prize winning wood carving, 'Sylph', described by Rintoul as a 'free form.' (Photo by Cary Van Sickle)**

plane GRUMMAN news

Published twice a month for the employees of Grumman Aerospace Corporation, Bethpage, N. Y. 11714, as a function of the Public Affairs Dept., Vice President J. B. Rettaliata, director.

Editor
Brian Masterson

Associate Editors
Claire Imrie
Al Wehren

Ads, Distribution
Dorothy Zeeb

Official Photographers
Presentations Services

Telephone
Plane News: 3293
Plane News from outside line: LR 5-3293

Checking out last LM vehicle

The last production Lunar Module, LM-12, is in Plant 5 Final Assembly for final acceptance checks. It will go to the moon aboard Apollo 17, in 1972. Spacecraft commander Gene Cernan and LM pilot Joe Engle were at Bethpage last week going through the "C-square F-square" activity (Crew Compartment, Fit & Functional) on LM-12 to make sure everything fits and works to their satisfaction.

The Apollo 15 astronauts, due to lift off next July, will be the first crew to have a LM that accommodates the roving vehicle.

The battery-powered Lunar Rover is equipped with a television camera that will be used by the crew when the vehicle is parked on the lunar surface. The TV can be controlled from the ground while Apollo 15 Astronauts Dave Scott, commander, and Jim Irwin, LM pilot, explore the moon. The rover will remain on the lunar surface after the astronauts return to earth.

Projected date for Apollo 15 mission is July 26, 1971. Command Module pilot is Al Worden. The crew is scheduled to explore Hadley Rille, one of the main features of the lunar landing area.

Write . . .

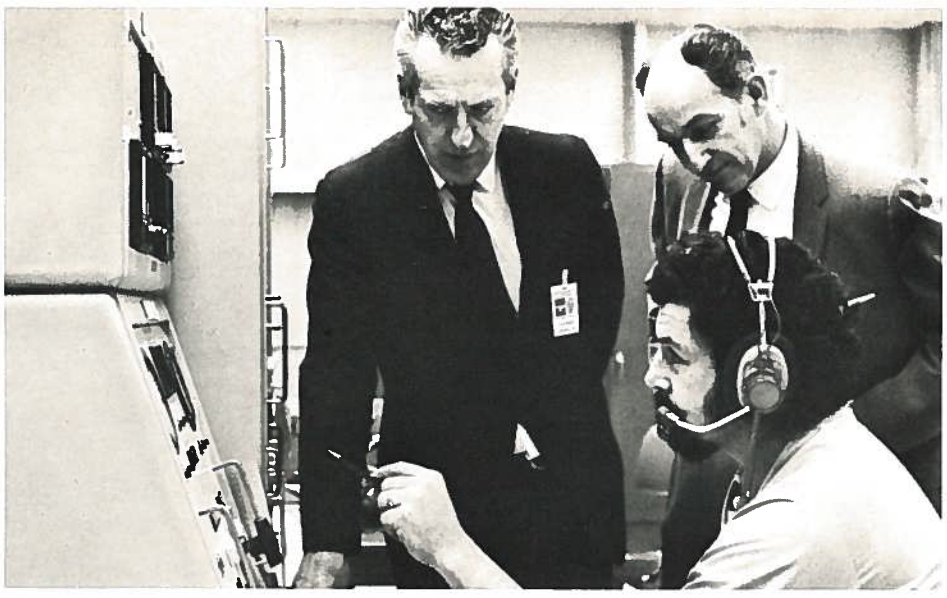
If you like swimming, boating, or fishing and you live on the North Shore of Long Island, we hope you read the recent article in Newsday regarding the Long Island Sound. Yes, it seems that things **are** that bad, and all indications point to increased pollution in the future. And it's the same for the Great South Bay. If you want cleaner Long Island waters, write to The Hon. Henry L. Diamond, Commissioner, Dept. of Environmental Conservation, Albany, N. Y. Tell him about your concerns, and offer any ideas you have to help the situation.

Announce shutdown of Sag Harbor plant

Grumman's machine parts manufacturing Plant 32 in Sag Harbor is going to be closed, Senior Vice President Corky Meyer told Plant 32 personnel last Friday, April 16. The move is a part of a facilities consolidation plan begun in January of last year and a 3,000-man workforce reduction announced earlier this year.

The plant closing, scheduled for September 30, 1971, and the workforce reduction are the results of decreased Federal spending for military and space programs. Prior to Meyer's announcement, these declines have necessitated the gradual shutdown of 250,000 square feet of facilities space at Grumman.

It is estimated that approximately 10 percent of the 140 employees at Sag Harbor will be offered positions in other major facilities of the Corporation. Representatives from the Personnel Department have been at the plant to assist in relocating employees and finding outside job opportunities. The workforce will be reduced gradually over the next four months as work is phased out.



LM-12 test. **Last production vehicle went through High Pressure Test Facility series at Bethpage, maintaining record for no lost-time accident in seven years. One more test day is coming in May. Roy Standefer (L) is asst. program director of Spacecraft Assembly & Test. Otto Mayer is his deputy and Wes Heflin (seated) was test conductor. (Photo by Fred Annette)**

Packard views F-14 at Mugu

Distinguished visitor. **Deputy Secretary of Defense David Packard and staff are briefed on F-14A at Navy facility at Point Mugu. (Navy Photo)**

Deputy Secretary of Defense David Packard and his staff dropped by recently for a tour of Grumman's F-14A facility at the Navy's Pacific Missile Range at Point Mugu, California.

Led by Tony Benjes, Grumman's program manager, and Capt. Edelbert (Dusty) Irish, commanding officer of the Naval Missile Control Center, Packard and his entourage saw SITS (System Integration and Test Station) schedule and status boards, equipment check-out areas, sub-system displays, and acceptance and repair sections.

Tom Brancati, Benjes' deputy, briefed the visitors on Tomcat's Research Development Test and Evaluation program. Then the Company's Mugu Engineering manager, Rudy Kretschek, Project engineer Bob McGuckin, and Systems engineer Mel Packard, provided a functional demonstration—during which Secretary Packard sat in the cockpit of SITS and worked the controls to acquire targets and initiate lock-on, using the AWG-9 weapon control system. The tour ended with a demonstration of the existing AWG-9 BIT (Built-In Test) routines.

The BIT, by the way, goes into the aircraft system, and the SITS will be the actual one in Tomcat No. 4.

Dignitaries on hand included John S. Foster Jr., DOD director of Research and Engineering; John W. Warner, Under Secretary of the Navy; Vice Adm. Vincent P. DePoix, USN, Deputy Director (Administration Evaluation and Management); Rear Adm. Thomas D. Davies, USN, Deputy Chief of Navy Material for Development; Capt. Carl A. Trost, USN, Executive Assistant and Naval Aide to the Under Secretary of the Navy; and Col. Ray B. Furlong, USAF, military assistant to the Deputy Secretary of Defense.

Day for Mom!

Hey, fellas and girls, Mother's Day is just ahead on May 9 and Employees Service suggests that you start thinking about an appropriate remembrance. ESO, by the way, feels it has a number of "appropriate remembrances" — beach and tote bags, corsages and jewelry accessories to name a few — that could serve as attractive Mother's Day gifts.

If you like, you can stop in at an Employees Service Office and browse around. Or if you should require more information, call your plant ESO or ESO headquarters, Ext. 3391, Plant 2.

Don't forget the date: May 9.

Ready F-14 No. 2 for flight testing

Tomcat No. 2 is due at Calverton. It's scheduled to fly this month.

After rigorous testing at Plant 1, where the hydraulics system went through million-cycle tests (comparable to 20 hours of flight test), the F-14A is ready for more tests: fuel calibration and weigh, instrumentation and propulsion run, engineering systems tests, and so on.

"We're doing things very carefully," remarks Joe Rodriguez, assistant to Vice President Mike Pelehach. "We're taking no chances."

Rodriquez indicated that Plant 1 ground tests had gone well, especially since hydraulic lines were changed in many cases; some are thicker, some are made of stainless steel, some have welded fittings.

Still in Plant 1 is Tomcat 1-X, the one that will do the job originally blocked out for No. 1. It's the high-speed test aircraft and is scheduled to fly next month.

OBITUARIES

Plane News has received word that death has come to the Grumman personnel listed below. We extend sincere sympathy to relatives and friends.

PETER D. BEHRENDT of TM Engineering - Methods Special Detail, Plant 11, died April 7. He was 54 years old and had been with Grumman since 1942. He lived at 250 Lincoln Ave., Sayville.

NELSON F. DEPEW of Surfaces & Assembly, Plant 5, died April 8 at the age of 61. He lived at 5 Klaffky Ct., Huntington, and had completed 24 years of service with Grumman.

GEORGE H. LITTNER died April 13 at the age of 47. He had been with Grumman six years, and his department was P/S Electrical & Integration Engineering, Plant 15. He lived at 95 Cabrini Blvd., New York City.

SAMUEL O. KNUTSON of Manufacturing Inspection, Plant 3, died April 17 at the age of 59. He lived at 26 Farmers Ave., Lindenhurst, and started at Grumman in 1952.

Fortune upsets Squicciarino to win Bethpage table laurels

They may never get to see The Great Wall of China, as did some more publicized ping pong players a couple of weeks ago, but that didn't stop table tennis aficianados at Grumman from having at it recently. So what if there wasn't any television coverage; or if the playing arena didn't seat 18,000; or if there weren't any national or international champs in the competition? Somehow, it didn't matter.

Not for John Squicciarino at least. "Squeegie" has been batting the ball around in the all-Bethpage championships long enough to be called a tournament fixture. The dark-haired slammer from Transportation has won himself a couple of singles championships, and once or twice picked up the doubles crown with Ray Repperger, another long-time tourney competitor from Transportation.

It looked like another good year for John. Representing Plant 20, "Squeegie" was heading for another title after running off three straight wins, the last a 21-16, 26-21, 21-19 victory over former champ Ted Wakulinski. All he had to do was wait for the last man to emerge from the losers' bracket in the two-defeat-and-out tourney. He was more than half-way home—one more win and he had it sewn up.

And who should pop out of the losers' column but Mark Fortune, who had lost earlier to Squicciarino, 16-21, 21-16, 17-21. Mark, an engineer from Plant 15 and defending doubles champion with Mark Palomba, rebounded from that loss to win three straight matches, the last a 21-19, 19-21, 21-19, over Ted Wakulinski.

Fortune didn't let up. Against Squicciarino in the finals, Mark put things even with a 21-17, 10-21, 23-21 victory. Now both had one loss apiece.

In the championship tilt, it was all even after two games in the best three-out-of-five final, with Fortune taking the first one 25-23 and John winning the second 21-17. Then it was over. Fortune swept the next two games, 21-19, 21-18, to capture his first class A singles championship at Bethpage. And he beat a couple of champs along the way to do it.

In the B division finals, George Harrington brought home another title to Plant 15 by bopping Sam Gates, 21-14, 14-21, 21-12, 21-17. Oh yes, Sam works in Transportation, too.

Thompson, Watson prove it's never too late

It took about 15 years but Grant Thompson finally did it. Grant teamed with Clint Watson to collect the class A doubles title, wrapping up the crown with a 21-15, 21-15 triumph over John Squicciarino and Ray Repperger.

To prove it was no fluke, Thompson and Watson knocked over last year's titlists, Mark Fortune and Ralph Palomba, 21-13, 21-12, in the second round.

There must be something to that old aphorism: If at first you don't succeed. . . .

The B division finals went to Ernie Jenkins and Frank Leach. They knocked over Frank Sacca and Dan Smith, 10-21, 22-20, 21-19, to earn honors in that doubles competition.

Fiore crowns King to take over Plant 11 diadem

The paddle whoppers had their whacks in the playoffs at Plants 11, 11A, and 16, too. In the winners' bracket, Jim King and Bob Fiore snarled across the table but Fiore purred with a 21-18 and 21-18 win. King beat Vin Caputo in the loser's bracket and then toppled Fiore. With one loss each, Fiore and King tackled again and it wound up 19-21, 21-18, 21-13, and 21-17. Fiore on top.

Perrot, Lavelle sweep Plant 27 honors

Plant 27 singles boiled down to a fierce wee-net encounter between George Perrot and Len Trifaro, with Perrot finally overpowering his opponent in the third game, 21-8, after 21-18 and 17-21 clashes. Trifaro was not out of it yet, though. He bounded up from the loser's bracket to ping Tony Alamo's pong, 21-19, 21-13. As before, the winner down there couldn't match the winner up there, and Perrot won 21-17, 17-21, 21-14.

Perrot got into the doubles, too, teaming with Ray Lavelle against Angelo Stefantos and Hal Corley, who'd lost one along the way. But Stefantos and Corley won, 21-15, 21-19, so there had to be a playoff. Perrot again, with Lavelle, banged out the win the hard way—13-21, 21-14, 24-22, 19-21, 21-12. The way it looks, the King of the Hill is Perrot.

Lee takes over singles crown at Syosset

Gat Lee stormed in to push Pat Courtney off the table in Plant 33 competition as Hy Dreksler established himself in the loser's bracket. Then the confrontation: paddles at the ready, eyes aglint. And when the rallies back and forth had finally ended, it was 12-21, 21-10, 21-12 for Lee.

Pomponio, McLaughlin, Bynoe stand out at Garden City

Singles action at Plant 36 in the winner's bracket saw Angelo Pomponio hop on Dave Hutchison early and often and pump out a 21-15, 21-19 win. Hutchison tried again, in the loser's bracket. He shoulda stood in bed: One Sam Phillip tabled his motion. So Angelo and Sam faced off. It must have been a scorcher, too hot to handle (or paddle), for from the net of secrecy came only two words: "Pomponio wins."

The doubles in the little white pellet game matched Pomponio and Jim Dandona against the team of Mat McLaughlin and Randy Bynoe. We assume they fought furiously as stellar ping pongists should. Via grape line we learn that Mat and Randy reigned.

Near pin title

Lynn Sowers pushed to a 203-733 in a four-game set to help Grumman take a 257-pin lead in the L.I. Industrial tournament for women, and unless the girls become completely untracked in the final round this Saturday night at Mid Isle Lanes, they appear headed for another title in the annual event.

This year the tourney is set up with four women on each of the 14 teams in the field, with the 12 games rolled over three rounds. Total pinfall decides the tournament winner.

Norma Frey paced the Grumman contingent in the opener, firing 222-201-723, then she came back last Saturday with 208-724. Captain Chin Thompson recorded 215-723 last week and 695 in the first round. Other Grumman scores were: Bertha Siegl, 626 and 641, and Sowers, 668.

The final round is set for tomorrow night, Saturday, April 24, at Mid Isle Lanes in Hempstead starting at 7:30 p.m.

First flower exhibit scheduled for May 12

Just over the hedge is Grumman's first 1971 flower show, and new Garden Forum Director Kay Zuk is hoping a lot of novices will have a go at displaying their spring blooms. The Tulip, Narcissus, and Lilac Show will be held at Plant 35 Cafeteria on Wednesday, May 12. The novice class is for exhibitors who have never won a blue in any show, in any class, she said. Retirees are also welcome to exhibit.

Submit entries by 8:30 a.m. Show will be open for viewing during both lunch periods. Managers are Sue Zamparelle and Arline Montgomery. For information call Kay Zuk, Ext. 3391.

Prizes will include bowls, ribbons, Flight Shop certificates, gift certificates for imported bulbs from Breck's of Boston, and National Tulip Society awards.

Playoff sweep by Newcomers

Bob Scully poured in 41 points, hitting on 19 field goals in the barrage, as the Newcomers ran wild in the final playoff game for the championship of the Thursday night basketball league. Scully had strong support in the 139-95 clincher over the Dacs as Jim Cruthers hit for 25 and Frank Quarto chipped in with 20. The big win helped the Newcomers finish with a perfect 15-0 record in the league.

The winners ran up a 26-point lead in the first period by collecting 41 points. And if there were any doubt as to the eventual outcome, the Newcomers opened their lead still further with a 45-point spree in the third period to take 109-74 margin into the final stanza.

In the playoff opener, Quarto sparked the attack with 29 points, with Scully and Cruthers contributing 25 apiece, in the Newcomers' 111-88 triumph over the Dacs.

Nite Owls lead Industrial play

Earl Schroeder, Rudy Dunkley, and Ernie Jenkins pushed the Grumman Mohawks to a commanding 236-pin lead over A.I.L. in the L.I. Industrial Nite Owl bowling classic last Sunday, and, at that, it could have been a lot worse for the rest of the eight-team field.

Schroeder set the tourney high-game mark with a 257 in a 594 string, Dunkley threw 201 and 210 in 593 to go ahead in the race for "Outstanding Bowler," and Jenkins hit 213-209-579. But things didn't go as well with Hank Kwiatkowski (he had 428) or Judge Locke (478), two of the high-average Owl keglers.

Hank and Judge will get their chance to unload next Sunday afternoon, starting at 1:30 p.m., when competition resumes at Mid Isle Lanes in Hempstead. The tournament finishes up on Sunday,

Grumman's second entry in the Owl competition, the Hellcats, didn't fare nearly so well. After two rounds the Hellcats are way down in the standings.

Plant 27 gives rope toss big play; Lopes, Rhodes, O'Connor shine

Would you believe that 29 guys have been ringing out the winter sports season at Plant 27 in a quoit-tossing contest? And when it was over, Gus Lopes proved the top pitcher in the tourney by ousting John Dunne, 25-20, 21-12.

Lopes had rapped Dunne earlier in the finals of the winners' bracket, but John managed to come back for an encore by eliminating Sal Catalano, 21-17, 0-11, 21-12, in the losers' section.

Things didn't go as smoothly for Cleo Rhodes and Joe O'Connor in the team matches, although they did win the quoits doubles crown in a marathon match with Sal Vetrano and Tom Bolen.

When Rhodes and O'Connor knocked off Vetrano and Bolen in the semi-finals of the winners' bracket, 23-13, 21-13, the losers never did get the message. Vetrano-Bolen ran through Sal Catalano and John Shrink, Angelo Stefantos and Joe Milczinski, and Ted Lombarski and Bud Baumann—and there in front of them stood Rhodes and O'Connor again.

POW! They socked it to the last undefeated twosome in the rope-toss, 18-21, 26-8, 11-0, to set up the clutch match in the tourney. (Yes, they do have clutch matches in quoits, too!)

But alas, Cleo and Joe had better aim in the closeout. It did go the full five games, as Rhodes and O'Connor outlasted Vetrano and Bolen, 25-5, 17-21, 20-22, 22-17, 36-31. Phew! It was a long one, champs.

Cooper's 719 sets Owl record, ties Grumman season high

From out of the depths of eighth place in Nite Owl play came the Squashers' Walt Cooper to atone for those nights when his name was not in the ranks of the leaders. He did it with a flourish —a 223, 244, 252 string that added up to a record 719, a high mark for Grumman leagues that was Bob Dudonis' exclusive property over in the Classified

Walt Cooper
Hits Owl record

loop. And despite Cooper's pin-rattling, he somehow fell short of the Owls' individual high-score mark of 266, racked up earlier by Ralph Laurino. But then, you can't have everything.

All in all, it was a pretty good day for the Nite Owls as Judge Locke scored with 245-206-634, Mike Valenti with 238-209-617, Bill Schramm with 212-235-611, and Earl Schroeder with a 234-602. Through it all, though, the Spoilers, Bombers, and Four Knights retained their 1-2-3 ranking in the standings.

Back in Classified, Dudonis wasn't being challenged, though F. Azzarello bashed the woods in a 218-215-612 effort. Behind him came F. Orlando's 215-224-598, K. Warta and H. Burkhardt's 570, B. Hoehn's 567, J. Strup's 554, and M. Husted's 551. The 10th place Mustangs won high team series, rolling 2,180.

In a class by himself was Bill Dodge of the Doof's, who rolls 'em in the Aerospace league. Dodge spun his heavy ball through the sticks and blasted Moran's league-high 246 with a pin-scattering total of 255. Alas! Glory is so fleeting: In the following week, John (not Bob) Dudonis of the Idiots couldn't let well enough alone. Dodge's 255 high went down the drain (or alley) as Dudonis blasted out a 257. There just ain't any respect for leaders anymore.

As Dudonis was spinning his record, some other keglers were kegling: Dan Aquilino, 222-213-657; Dick Corrigan, 596; Tom O'Connor, 225-587; Dom Martino, 212-579; Ed Bader, 566; Jesse Zimmet, 209-555; Bill Dodge, 554; and Tony Rivello, 550.

Hart hits 255-675

April 7 was the date that the Outpost league began its GAA sweepstakes, with the winners adjudged by the most pins rolled over average for the first nine games during the last four weeks. And there were some sparks as competition got keener. The highlight on the 14th was a squeaker as Bob Caminiti's net high game of 254 fell as Grover Hart came home with a 255. Hart also improved his net series mark, leaving a 664 behind and clambering up to 675. Caminiti was yipping at his heels, rolling 235-225-633 in the latest session. In the top group were Bert Bertolami, 599; John Lau, 236-598; Ralph Nelson, 222-578; Bob Denien, 210-574; Joe Avanzato, 204-573; Rak Moser, 559; Ken Carmen, 206-557; Sal Licari, 200-552; and Tony Bezas, 200-548. . . . Over in the Trader loop, only Hal Vetter, Tom Wright, and George Ketcham were among the high-score notables for two weeks, Vetter placing second both tmes (200, 209 and 221), and Ketcham high the first night (224). Tom Wright's 216-595 was high series on April 2, but a week later it was all Al Weston as he copped both individual and series highs with 228 and 603. Chasing him, and not making it, were Ketcham, 221, Jim Rose, 218, John Logan, 211, Wright, 205, Sid Weihs, 205, Ketcham, 204, and Charles Schmidt 201.

The big news in the Black league was the spectacular rush of the Strikes, who leapfrogged over the Mets, Choppers, and Mixers, had only the Mets to contend with on the final night, and did away with them as they won league honors. On that fateful eve, three of the Strikes got hot (Frank Weber, 210-587, Steve Lawrow, 532, and S. Haras, 211-552) while the Mets were as cold as polar ice. The best of the heavy-round-ball spinners were Stan Miron and Ken Camidge, each as 229; high series went to Bob Specht of the Lollipops, 205-225-608, five pins betters than R. Johannessen's 603. Other good ones included Art Grey, 208, E. Schlott, 204, R. Boyce, 203, and M. D'Agostino, 200. Camidge won high scratch and Schlott took high handicap. Winners of the GAA Incentive Tournament were Doug Nakamura, Walt Stehlin, and Sid Higbie.

Monica Wojtyniak just wouldn't let up in the Syosset Mixed league, scattering the tall 10s with a 211-204-191 effort that added up to a record league high of 606. Rita Mathia was among the leaders with 215 and Diane Hartmann sneaked in a 201. Hank Abrami copped the men's high game and series with his 222-582, and tagging along were Jim Coyne at 213 and both Ed Miron and Ernie Bloodgood at 211. But forget that: The loud applause belongs to Monica. Yyyehhhh, Monica!

Norma Landin stars

Norma Landin gave a bowling lesson to the boys in the Patchogue Mixed April 6 banging the wood for a season high 229. No fluke that, either: She also holds season high series, 573. Pinfall changed when Friday the 13th came on Thursday — but still, high individual game went to a gal, Maggie Gaynor, who hit 223. Norma had a 189 this time, Lois Haas a 188, and Joan Burgess a 181. Highs for the guys were: Gene Burgess, 215, Bob Geer, 208, Ken Becker, 205, and Bob Wilk, 192. Series highs were Maggie's 559 and Gene's 603. . . . The men finally got the upper hand, but in a different league, the Wednesday Night Mixed. The Gabriels (Ed and Roseann) blew their horns as each had high singles, Ed a 214, Roseann a 189. Stickouts for the gents were Pete Jordan, 212-200-594, Gabriel, 556, Lee Grey, 198, Bob Terry, 197-538.

Waisanen hot shot

Paul Waisanen returned to the Grumman Gophers lineup recently, shot a 196 of a possible 200, and helped his team clinch second place in the South Shore rifle league. Supporting Waisanen in a 971-953 victory over Sunrise were George Hilton, 195; Joe Anckner, 194; Hank Womble, 194, and Rein Rand, 192. Jim Cook fired a 199 for the Sunrise squad.

The Gophers are still undefeated, and now hold a 10-0 record in the L. I. Industrial league. Only Pan American stands in the way of a perfect season.

Scura pockets billiards crown

It may not have been a re-run of "Shootout at OK Corral," but the cast of characters seemed mighty familiar in the final "shootout" for the GAA pocket billiards championship a couple of weeks ago. Lined up across the table were George Massey, who took the crown in 1964 and again in 1969, and Cosmo Scura, defending champion in competition at the House of Lords in Plainview.

In the two-loss-and-out tourney, Scura winged Massey 100-65 to plunge him into the loser's bracket. Massey managed to edge past Phil Rizzutto, 100-92, to emerge from the loser's column as Scura's lone contender for the billiards' crown.

Massey caught Scura in his sights in the first game of the finals, 100-82, to put them all even at one loss apiece, setting up the next game as the make-or-break tilt.

But, gad zooks, the action, if not a re-run of "Shootout at OK Corral," was a playback of the '70 championships, for in the final, Scura out-shot Massey, 100-67, to win his second straight billiards title.

Earlier, Massey had more success in the billiards league, taking first place in individual competition with a total of 1,057 points in the A group. Ken Lango was runner-up with 1,033.

Joe Stecewycz and Charlie Friedrich, who dubbed themselves the "Drawbacks," proved anything but that as they captured first in team play with a 1,990 total. The "Bankers," Lango and Charlie Thomas, finished second.

In B competition, John Dick's 1,065 earned solo honors while George Papini, who had 1,006, was second.

Calling low-handicap swingers for varsity golf team tryouts

The annual 54-hole golf trek to decide the makeup of the Grumman varsity tee team is set to begin on Monday, May 17, at Bethpage State Park. Only Grumman golfers with handicaps of 10 or less are eligible to enter the tryouts. Handicaps must have been established over regulation layouts, and all league or club handicaps should be included on the entry form.

Varsity berths will go to the eight low medal players in the three 18-hole rounds. After the second round, set for May 19, the field will be sliced to the 16 low scorers, with the varsity eight determined on total scoring for the 54 holes, which ends on May 24. Play will be held on the Red and Black courses at Bethpage.

Entry forms should be forwarded to Mike Cherry at the GAA office, Plant 28B, by April 30.

The Grumman varsity, perennial champion of the L.I. Industrial circuit, will be seeking its eighth straight team title in that play.

Varsity golf tryouts

Entry blank

Name ..... Perm. No. .....

Dept. ..... Plant ..... Ext. .....

Club or league	Course	Handicap

Submit to GAA, Plant 28B by April 30

Data Systems homecoming

Ring-bedecked fingers flashing over keyboards . . . warm colors splashed over office and equipment panels . . . operations rooms almost antiseptically clean . . . spinning computer tapes . . . the whir of movement.

At the new Data Systems Center on Stewart Avenue in Bethpage there is a "feel" of activity. More than 700 Grumman Data Systems people moved into their new home a couple of weeks ago, and from all reports, they like it.

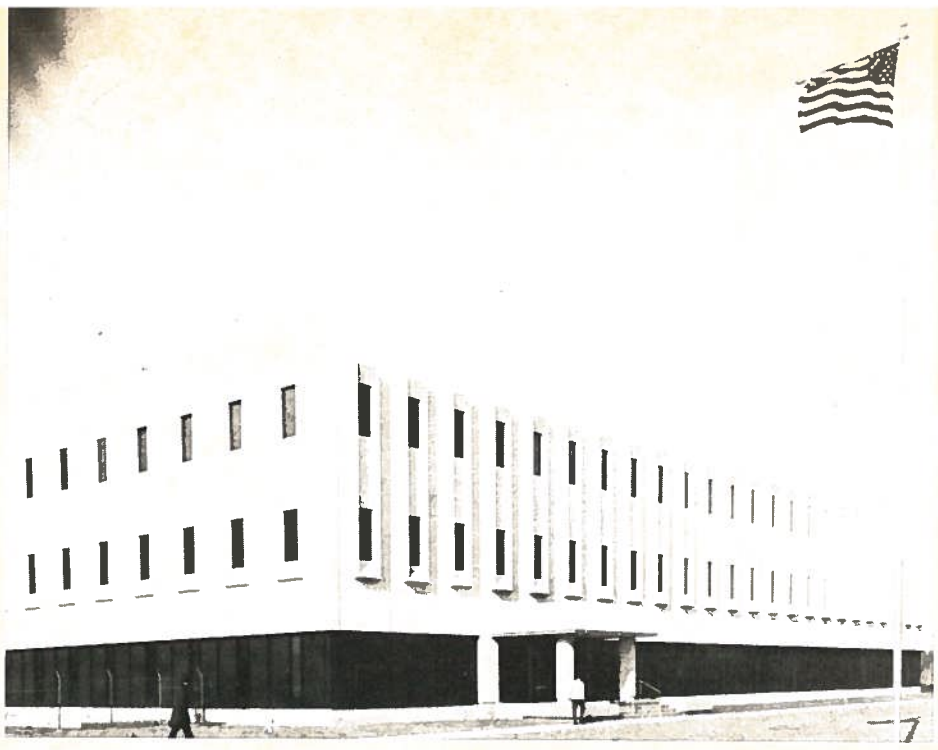
It's warm, bright, modern—reflecting, in a sense, the business philosophy of President Pete Viemeister and the entire Data Systems organization. The homecoming marked the first permanent residence of the Grumman Corporation subsidiary, which celebrated its first birthday earlier this year.

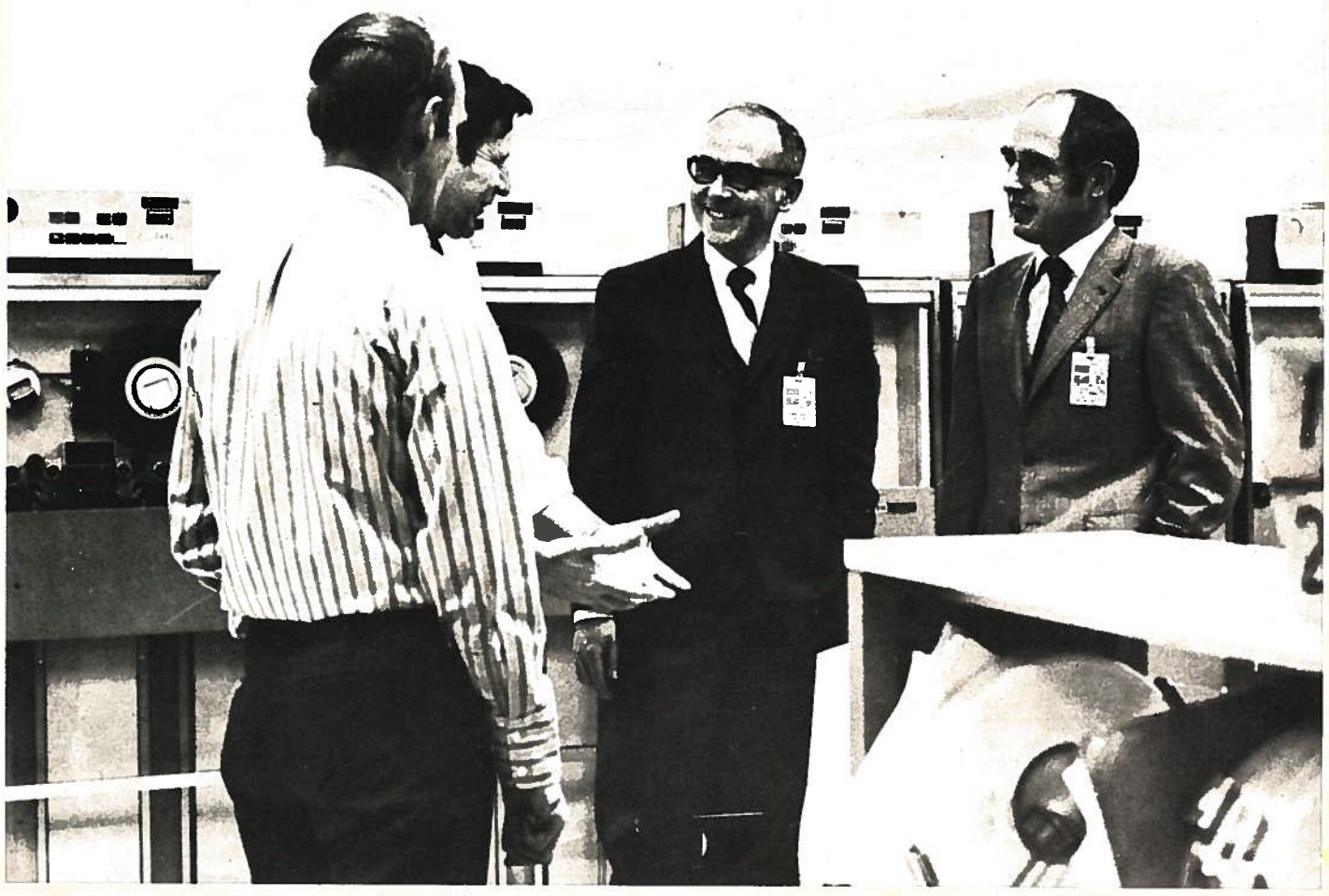
About 300 more from Data Systems are sprinkled about in other Grumman facilities helping to support ongoing aerospace and hardware programs.

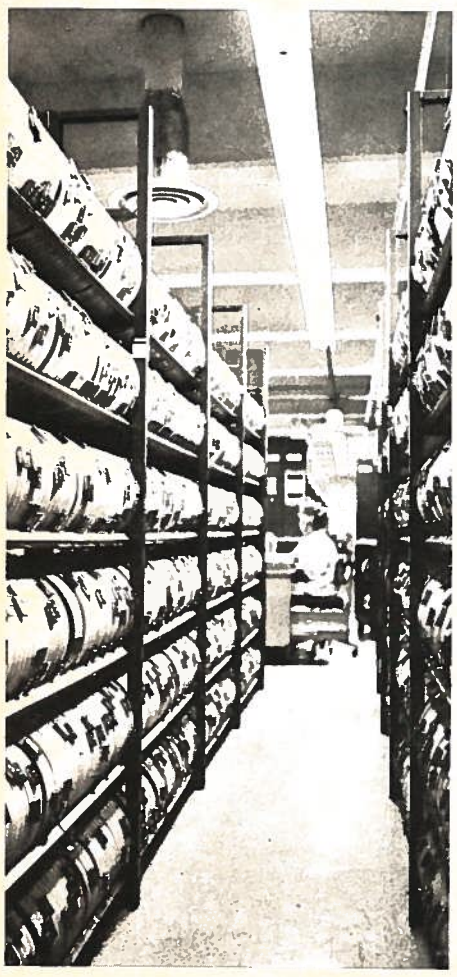
The Data Systems Center, designed by Facilities Engineering and constructed by the Austin Company, is custom-built for computer operations. "Floating" floors give added protection to computer equipment situated on the concourse for technical application, and on the first floor where business operations are centered. Keypunch operations—a vital segment of the Corporation—is also located on the first floor.

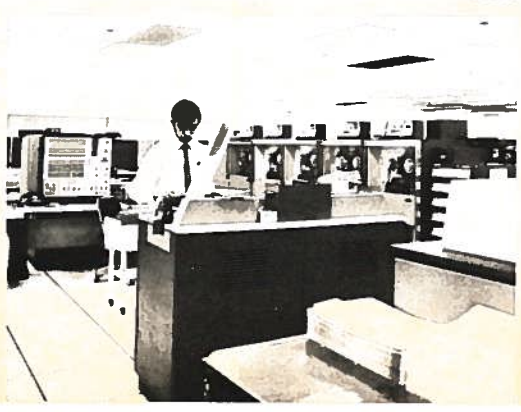
Programming and management systems and supporting staffs occupy the second floor, and a dining room and buffeteria are located on the concourse. The third floor of the facility will be leased to outside commercial companies.

Wear it in good health!









New home. Though members of Grumman Data Systems are still getting used to their new home in Bethpage, it's 'business as usual' for the computer-services organization. Above, Vice President Walt Wood (2nd R) and Gerry Berg, director of Computer Operations, stop for chat during tour of business applications section, while other photos show various segments of life in Data Systems. (External facility shot by Harry Prodromides, all internal photos by Fred Annette)